

Arvind Borde

PHY 12: Homework W

1. The formula for the angles at which constructive interference occurs (crests reinforce crests) when light passes through two slits is

$$\sin \theta = m \frac{\lambda}{d}, \quad m = 0, 1, 2, 3 \dots$$

where d is the spacing between the slits and λ the wavelength. Do you expect the bright bands to get more closely spaced or less when d is very large compared to λ ? **More closely spaced.**

2. In a double slit experiment do you expect closer spacing of the bright bands for (i) red wavelengths, OR (ii) blue wavelengths? **Blue**

3. Diffraction effects when a wave hits an obstacle are most pronounced when the wavelength is of comparable size or larger than the obstacle. Sound waves have wavelengths of feet or meters. Might this explain why when someone is around a corner you can hear but not see her/him? **Yes**

4. What are the best reasons you can think of to view light as (i) a wave, and (ii) a particle?

Diffraction; interference

Photoelectric effect

5. You expect destructive interference between two waves (crests of one coincide with troughs of the other) when they are shifted with respect to each other by (i) one wavelength? OR (ii) half a wavelength? **Half**